



AF 12682

2700

#16

JL  
4/23/04

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Akram M. Hosain et al. § Art Unit: 2682  
§  
§  
Serial No.: 09/412,099 §  
§  
Filed: October 4, 1999 §  
§  
Title: Accounting Method and § Examiner: Yuwen Pan  
Apparatus for §  
Communications Networks § Docket No. NRT.0013US  
(RR2646)

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

RECEIVED

APR 20 2004

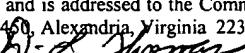
Technology Center 2600

REQUEST TO REINSTATE APPEAL AND  
TRANSMITTAL OF SUPPLEMENTAL APPEAL BRIEF

Dear Sir:

Applicant hereby requests reinstatement of appeal in response to the Office Action dated January 20, 2004.

Transmitted herewith in triplicate is the Supplemental Appeal Brief in this application. There is no fee due for this Appeal, because the Examiner reopened prosecution after filing of the first Appeal Brief on October 14, 2003. The Commissioner is authorized to charge any additional fees and/or credit any overpayment to Deposit Account No. 20-1504 (NRT.0013US).

Date of Deposit: *April 14, 2004*  
I hereby certify under 37 CFR 1.8(a) that this correspondence is being deposited with the United States Postal Service as **first class mail** with sufficient postage on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.  
  
Dawn L. Thomas

Respectfully submitted,



Date: 4-14-04

---

Dan C. Hu, Reg. No. 40,025  
TROP, PRUNER & HU, P.C.  
8554 Katy Freeway, Suite 100  
Houston, TX 77024-1805  
713/468-8880 [Phone]  
713/468-8883 [Facsimile]



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant: Akram M. Hosain et al. § Art Unit: 2682

Serial No.: 09/412,099 § Examiner: Yuwen Pan

Filed: October 4, 1999 §

Title: Accounting Method and § Docket No. NRT.0013US  
Apparatus for § (RR2646)  
Communications Networks §

**RECEIVED**

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

APR 20 2004

Technology Center 2600

**SUPPLEMENTAL APPEAL BRIEF**

Dear Sir:

Applicant hereby appeals from the rejection dated January 20, 2004, rejecting claims 1-3, 5-8, 16-22, and 24-39. The same rejections as in the final Office Action dated May 21, 2003, were applied against claims 1-3, 5-8, 16-19, 21, 22, and 24-39. A new ground of rejection was raised against claim 20.

**I. REAL PARTY IN INTEREST**

The real party in interest is Nortel Networks Limited.

**II. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

Date of Deposit:	April 14, 2004
I hereby certify under 37 CFR 1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.	
Dawn L. Thomas	

### III. STATUS OF THE CLAIMS

Claims 4, 9-15, and 23 have been cancelled. The remaining claims 1-3, 5-8, 16-22, and 24-39 have been at least twice rejected and are the subject of this appeal.

### IV. STATUS OF AMENDMENTS

An Amendment after final was submitted on July 21, 2003. The present Office Action indicates that the Amendment after final has been entered.

### V. SUMMARY OF THE INVENTION

In accordance with some embodiments, an accounting framework is provided for the various types of services offered by service providers over a data network 16 (Fig. 1) in which usage of services over the data network 16 is accounted for and which defines accounting units of predetermined formats that form the basic units for the exchange of accounting information. A uniform or common format is defined for the accounting units, which may be employed by multiple entities, such as service providers, to exchange accounting information. Specification, p. 5, lines 21-27.

“Accounting” is used in its broad sense to refer to the collection, recordation, or communication of information from which an entity such as a service provider can determine charges to bill a subscriber or customer. “Accounting” may also refer to the billing or charging of subscribers or users of services. An “accounting framework” refers to the method and system employed to implement the accounting. Specification, p. 5, lines 28-33.

The accounting framework provides a mechanism to account for usage of services in the data network 16 by either fixed nodes or mobile nodes. In accordance with some embodiments, usage of the wireless connection services offered by the various service providers (36, 38, 40, 42) as well as services over the data network 16 are subject to accounting. Specification, p. 8, lines 4-16.

Referring to Fig. 2, three entities are illustrated: a serving service provider 50, a home service provider 52, and a customer service provider 54. Although illustrated as separate entities, the service providers 50, 52 and 54 may be one entity. For example, a mobile node that stays within its home network is served by its home service provider. The home service provider 52 may also be responsible for customer service tasks such as billing and establishment of services (tasks that may be provided by the customer service provider 54). The accounting framework is also available for fixed nodes, such as fixed node 66. When applied to a fixed node, the concept of visiting another network is not applicable. The accounting information of a fixed node is collected by its home service provider, which may be an Internet service provider. Specification, p. 8, line 33-p. 9, line 9.

In the illustrated embodiment of Fig. 2, a mobile node may be serviced by the serving service provider 50. Usage of services is monitored by an accounting meter 56, which communicates accounting units to an accounting processor 58 in the serving service provider. The accounting processor 58 packages the accounting units into accounting segments that are sent to an accounting processor 60 in the home service provider 52 and/or to an accounting processor 62 in the customer service provider 54.

Such accounting segments may also be packaged as accounting segments and sent from the home service provider 52 to the accounting collector 62 in the customer service provider 54. From information in the accounting collector 62, bills may be generated for subscribers of the customer service provider 54. As used here, an “accounting unit” may refer to the unit of accounting information collected by a monitoring device such as the accounting meter. “Accounting unit” may also refer to any accounting information packaged to be exchanged between entities, such as the accounting segments referred to above. Specification, p. 9, lines 10-23.

An accounting meter 68 may also be provided in the home service provider 52 for monitoring usage of mobile nodes in its network and to monitor usage of the fixed node 66. The accounting meter 56 in the serving service provider 50 may also be coupled to fixed nodes. The designation of “serving” and “home” when applied to fixed nodes is not applicable. Fixed nodes are coupled to their subscribed service providers. However, to the extent that a fixed node is accessing a network operated by another service provider, the other service provider may collect accounting information from which the subscriber may be charged. Also, the designation of “serving” and “home” as shown in Fig. 2 may be swapped if another mobile node has the service provider 50 as its home provider and the service provider 52 as its visited or external provider. Specification, p. 9, lines 24-34.

Referring to Fig. 3, in accordance with some embodiments, each accounting unit 70 generated by the accounting meter 56 or 68 may include a number of fields to monitor usage of wireless networks and the data networks. Such fields are used to account for

usage of services in accordance with some embodiments so that subscribers may be billed. Specification, p. 10, lines 1-5.

A service type field 71 in each accounting unit 70 indicates the type of service that is provided on the data network 16. Such services may include real-time services (such as multimedia conferencing or messaging), electronic commerce, multicast services, electronic mail services, web browsing, file transfer services, and so forth. The service type field 71 allows a service provider to bill according to service type, since different types of services require different levels of resources. For example, multimedia conferencing may require a relatively high level of resource usage on the data network 16 since relatively large amounts of data are communicated with some level of quality assurance. Accordingly, a service provider may charge more for such services. On the other hand, electronic mail requires relatively low resource usage. The service type field 71 is logged in the accounting unit 70 when a subscriber makes a service request. Specification, p. 10, lines 6-17.

Another field in the accounting unit 70 is a usage of air interface field 72, which provides information of radio resource usage by a mobile node. The usage of air interface field 72 describes the amount of data transmitted to and from the mobile node along with quality of service (QoS) information to indicate whether the data sent is delay sensitive or delay tolerant. The usage of air interface field 72 may also supply the user protocols employed, such as IP or X.25. The amount of data that is sent or received to or from the mobile node 64 is logged. Specification, p. 10, lines 18-24.

Another field in the accounting unit 70 is a usage of external data network field 73, which provides charging information describing the amount of data sent and received from the visited or external data network provided by the serving service provider 50. The usage of external data network field 72 helps to consolidate the billing issues between two service providers by setting up the billing rate for inter-network roaming by a mobile node. The amount of data that is transferred between a mobile node and a visited or external data network is logged in this field. Specification, p. 10, lines 25-31.

Another field is a usage of mobility management field 74, which provides information of mobility management resources. A mobile node can choose to activate or not mobility management. If mobility management is activated, the mobile node can roam between different networks while staying connected to the data network 16. Such a capability is offered by mobile IP, in which a care-of address may be changed as a mobile node changes its points of attachment to the data network 16 when it travels between networks. The mobile node may be in one of three mobility management states: idle, standby, and active. In standby or active state, mobility management is available. However, when the mobile node is in an idle state, mobility management is turned off. When in the idle state, the ability to stay continually connected to a data network as a mobile node changes points of attachment is not available. A subscriber may be charged for mobility management based on the amount of time used, such as by the second. Specification, p. 10, line 32-p. 11, line 10.

The accounting unit 70 also includes a billable number field 75. The billable number field 75 may be in the format of a credit card number, an authorization number, a

full national number, an IP address, or even a phone number. The field 75 provides the information about how to bill the mobile node. The billable number field 75 may include a type sub-field to identify the type of billable number. The billable number field 75 may be set for each subscriber when service is initially established for a subscriber by a provider, or the field 75 may be dynamically set depending on how a subscriber desires to pay for a given service. Specification, p. 11, lines 11-28.

Another field in the accounting unit 70 is a charging zone field 76, which allows for different charging zones to be set up in a logical network. This information allows a service provider to charge a subscriber different rates in different locations, such as by geographic locations or by intranet versus Internet use. Specification, p. 11, lines 19-23.

Another field is a termination error code field 77, which records any error that may cause an abnormal service termination. This information helps a service provider to improve service as well as to justify issuing credit to the user if needed. The information is captured when a call is dropped due to any error. For example, international calls may suffer high degradation in quality due to low quality transmission facilities of the called party. Having this field makes it easier for the service provider to issue credit to the users, who may complain about poor quality. Specification, p. 11, lines 23-29.

The accounting unit 70 may also include a source and destination address field 79, which describes the source and destination addresses (e.g., IP addresses) of source and destination endpoints. The source and destination addresses help identify the network entity that sends packets to a served mobile or fixed node, and also identifies the destination of packets sent from the served mobile or fixed node. This information is

logged while a subscriber sends or receives data. Specification, p. 11, line 30-p. 12, line 2.

Another field is the quality of service (QoS) field 78, which indicates the quality of service, such as for voice communications or multimedia conferencing over the data network 16, that was employed for the particular communications session. The higher the QoS, the larger the bandwidth consumed, thus justifying billing the user at a higher rate. Specification, p. 12, lines 3-7.

The accounting unit 70 also includes a data packet count field 80, which counts the total number of data units that are exchanged between the mobile node 64 or the fixed node 66 and a service provider. Another field is a network access identifier field 81, which is used to uniquely identify a node in a network (e.g., user@nortel.com). The service provider provides this unique information before service can be rendered to the node. The NAI can remain unique even in a private network setup where an IP address that belongs to the particular enterprise may easily be a duplicate of another public (unique) IP address. Specification, p. 12, lines 8-15.

A usage of PDP (Packet Data Protocol) context and tunnel management services field 413 includes charging information describing how long a mobile node has used the packet data protocol (e.g., IP or X.25). Such information provides a service provider the opportunity to charge for the usage of a packet data protocol. While PDP context and tunnel management is active, a mobile node is allowed to send and receive data. When PDP context and tunnel management is not active, a mobile node is not allowed to send or receive data. A mobile node may choose to stay in an active PDP context and tunnel

management state even though it is not actively sending or receiving any data. If PDP context and tunnel management is active, a service provider may want to know about the duration of this active state and charge accordingly. Specification, p. 12, lines 16-26.

A metering class field 414 indicates metering values such as pay phone, credit card, test call, ordinary, audit purpose, study, and so forth. If chargeable, this information is used to identify the billing rate of the call. This is captured during the registration of a call. Other fields that may be included in the accounting unit 70 are described further below. Specification, p. 12, lines 27-31.

Although the above summary describes some embodiments of the invention, it is noted that other embodiments are also within the scope of the claims on appeal.

## VI. ISSUES

- A. Are Claims 1-3, 5-8, 16-19, 21, 22, 24-31, And 34-39 Anticipated By Rai?**
- B. Is Claim 20 Rendered Obvious By The Hypothetical Combination of Rai and Yost?**
- C. Are Claims 32 And 33 Rendered Obvious By The Hypothetical Combination Of Rai And Brown?**

## VII. GROUPING OF THE CLAIMS

Group 1: Claims 1-3, 5-7, 21, 22, 24-28, and 31

Group 2: Claims 16, 17, 34, 37, and 38

Group 3: Claims 29 and 30

Group 4: Claims 8 and 35

Within each group, the claims stand and fall together. The remaining claims are not part of any group.

## VIII. ARGUMENT

All claims should be allowed over the cited references for the reasons set forth below.

### A. Are Claims 1-3, 5-8, 16-19, 21, 22, 24-31, And 34-39 Anticipated By Rai?

Independent claim 1 recites a method of accounting for services provided over a packet-based network that comprises determining a type of service used over the network, monitoring usage of the service, and collecting accounting information based on the type of service and usage of the service, wherein collecting the accounting information includes compiling the accounting information into an accounting unit. The accounting unit has a first entry to indicate a quality of service provided over the packet-based network, and a second entry to indicate mobility management.

¶ Contrary to assertions by the Examiner, Rai does not disclose an accounting unit that has an entry indicating a *quality of service* and another entry indicating mobility management. The Examiner cited to the following passages to support his contention

that Rai discloses an accounting unit having a first entry to indicate a quality of service: column 18, lines 55-65. 1/20/04 Office Action at 2, 3. The cited column 18 passage of Rai refers to a home registration server accessing the subscriber's directory to learn subscriber service profile information (including quality of service options subscribed to). These passages describe registration and configuration procedures performed by an end system to gain access to the network functions mentioned elsewhere in Rai. However, nowhere within the cited passage in column 18 is there any mention whatsoever of the collection of an accounting unit that has a first entry to indicate a quality of service.

In the Advisory Action dated July 29, 2003, the Examiner further noted that QoS is taught in column 19 at lines 51-60 of Rai. The cited column 19 passage of Rai discloses end system service configuration for configuring network service for an end system based on a subscriber's service profile. The subscriber's service profile includes information to authenticate the end system's ISP and quality of service (QoS) information. Rai, 19:56-60. Again, this passage also does not disclose *an accounting unit* having a *first entry* to indicate a quality of service.

Therefore, the Examiner has failed to cite to any evidence for the contention that Rai discloses an accounting unit having a first entry to indicate a quality of service. In fact, when Rai actually discusses accounting attributes reported in accounting packets by accounting clients to accounting servers in column 29, Rai makes no mention of QoS. The seven accounting attributes listed in column 29 do not relate to QoS.

For this reason alone, Rai does not anticipate claim 1. Furthermore, as a separate, independent basis of allowability of claim 1 over Rai, the Examiner has also failed to

(v) Establish that Rai discloses an accounting unit having a second entry to indicate mobility management. The Examiner cited to the following passages of Rai as disclosing the recited feature: column 2, lines 36-40; column 19, lines 50-64. 1/20/04 Office Action at 3. The cited column 2 passage notes that mobility management is supported. That by itself is *no* teaching of an *accounting unit* having a *second entry* to indicate mobility management. The cited column 19 passage refers to end system service configuration based on a subscriber's service profile. However, there is no indication in this passage of an accounting unit having a second entry to indicate mobility management. None of the accounting attributes listed in column 29 of Rai relate to mobility management. Therefore, this additional feature of claim 1 is also not disclosed by Rai.

In view of the foregoing, claim 1 is clearly allowable over Rai.

With respect to each of independent claims 21 and 31, Rai fails to disclose an accounting unit having an entry indicating a quality of service and a second entry indicating usage of mobility management

With respect to independent claim 16, Rai fails to disclose a unit of accounting information having an entry indicating a quality of service provided over a packet-based network.

Independent claim 29 was also rejected as being anticipated by Rai. Claim 29 recites an article including one or more machine-readable storage media containing instructions for accounting for services used on a packet-based network, with the instructions when executed causing a system to determine usage elements associated with each service, the usage elements including a service type, an amount of data

communicated, and mobility management. The instructions when executed also cause the system to collect accounting units each including entries identifying the usage elements (service type, amount of data communicated, and mobility management).

(3) As discussed above, Rai does not teach or suggest collecting accounting units including an entry that identifies mobility management. In addition, Rai also fails to disclose collecting accounting units each including an entry identifying an amount of data communicated. The rejection of claim 29 is found on page 5 of the 1/20/04 Office Action. However, in the rejection, no mention is made whatsoever of where in Rai there is any teaching of an accounting unit that identifies *an amount of data communicated*. Appellant submits that such an entry does not exist in the system of Rai. None of the accounting attributes listed in column 29 of Rai has any bearing on the amount of data communicated. Therefore, claim 29 is clearly allowable over Rai.

The claims dependent from the independent claims noted above (1, 16, 21, 29, and 31) are allowable for at least the same reasons as the corresponding independent claims. The following sets forth additional arguments relating to allowability of selected dependent claims.

Claim 8 depends from independent claim 1 (through intermediate claim 7). -Claim 8 recites determining one of a plurality of service types, and collecting an additional entry of the accounting unit assigned a value to indicate a type of service. Claim 8 further recites that determining one the plurality of service types includes determining one of real-time communications and at least another type of service. None of the accounting attributes listed in column 29 of Rai discloses an entry of an accounting unit that

indicates a type of service that can be one of real-time communications and at least another type of service.<sup>K</sup> Column 29 indicates that one of the accounting attributes is Service Type. However, Rai notes that the Service Type accounting attribute is "like the Radius Service-Type attribute, and that the value of this attribute is set to Framed." Rai, 29:21-23. Thus, the Service Type field disclosed in Rai does not indicate one of real-time communications and at least another type of service. Therefore, dependent claim 8 is allowable over Rai for this further reason.

Dependent claim 35 is allowable over Rai for similar reasons as for dependent claim 8.

Claim 18 depends from independent claim 16 (through intermediate claim 17). Claim 18 recites assigning values to additional entries including entries indicating usage of mobility management and an amount of data transferred.<sup>K</sup> As discussed above, Rai does not teach a unit of accounting information having an entry to indicate usage of mobility management or an entry to indicate an amount of data transferred. Dependent claim 18 is thus allowable over Rai for this further reason.<sup>K</sup>

Claim 19 depends from independent claim 16 (through intermediate claims 17 and 18). Claim 19 recites assigning a value to an additional entry in a unit of accounting information that indicates erroneous termination of communications.<sup>K</sup> The Examiner cited to column 22, lines 33-39 of Rai as teaching this feature.<sup>K</sup> 1/20/04 Office Action at 5. Appellant disagrees, since the cited column 22 passage refers to a disconnect request/response/notify message to disconnect a tunnel, and an error notify message for

error notifications. However, this cited passage does not disclose an entry *of an accounting unit* to indicate erroneous termination of communications.

Claim 36 depends from claim 16, and further recites communicating a traffic matrix segment having a header and plural rows, with each row containing accounting information associated with a session having a given time and duration. Nowhere within Rai is there any teaching of such a traffic matrix segment.<sup>1</sup> Each of plural rows of the traffic matrix segment recited in claim 16 contains accounting information associated with a session having a given time duration, which is not disclosed by Rai. Therefore, claim 36 is allowable over Rai for this further reason.

Claim 39 depends from independent claim 29, and further recites that usage elements identified by entries of an accounting unit include quality of service. As discussed, Rai fails to disclose an accounting unit having an entry indicating quality of service. Therefore, dependent claim 39 is allowable for this further reason.

For the foregoing reasons, the rejections of claims 1-3, 5-8, 16-19, 21, 22, 24-31, and 34-39 should be reversed.

**B. Is Claim 20 Rendered Obvious By The Hypothetical Combination of Rai and Yost?**

Claim 20 was rejected over the hypothetical combination of Rai and Yost.

The filing date of Yost is August 12, 1999, which is *after* the priority date of the present application. Note that the present application claims priority under 35 U.S.C. §119(e) to U.S. Provisional Application No. 60/104,107, filed October 13, 1998, and

Provisional Application No. 60/127,406, filed April 1, 1999, both having filing dates earlier than the filing date of Yost.

Since Yost does not constitute prior art against claim 20, the § 103 rejection of claim 20 should be reversed.

Also, in view of the fact that Rai fails to disclose or suggest any of the elements recited in claims 16-19 (claim 20 is dependent from claim 19), as discussed above, it is respectfully submitted that any combination of Rai and Yost would fail to teach or suggest each and every element of claim 20.

**C. Are Claims 32 And 33 Rendered Obvious By The Hypothetical Combination Of Rai And Brown?**

Claims 32 and 33 were rejected over the hypothetical combination of Rai and Brown. As conceded by the Examiner, Rai does not disclose a field to indicate if a service is chargeable. 1/20/04 Office Action at 8. However, the Examiner relied upon Brown as disclosing this element.

The obviousness rejection is defective for at least the following reasons. The obviousness rejection is premised on the assertion by the Examiner that Rai discloses a field for indicating a quality of service provided over a packet-based network. As discussed above, that is clearly not the case. Therefore, even if Rai and Brown can be properly combined, the asserted combination of Rai and Brown does not teach or suggest at least a field indicating a quality of service provided over a packet-based network. This violates one of the requirements of a *prima facie* obviousness case, namely that the

asserted combination of references must teach or suggest all elements of the claim at issue.

Also, with respect to dependent claim 33 (which depends from claim 32), the obviousness rejection is based on the assertion by the Examiner that Rai discloses a field that indicates if mobility management is provided for a node. As discussed above, Rai clearly does not teach such a field. Therefore, even if Rai and Brown can be combined, elements of claim 33 are not taught or suggested.

For the foregoing reasons, the rejections of claims 32 and 33 should be reversed.

#### IX. CONCLUSION

For the foregoing reasons, the final rejections should be reverse and the claims be allowed to issue.

Respectfully submitted,

Date: 4-14-04



Dan C. Hu, Reg. No. 40,025  
TROP, PRUNER & HU, P.C.  
8554 Katy Freeway, Suite 100  
Houston, TX 77024-1805  
713/468-8880 [Phone]  
713/468-8883 [Facsimile]

## APPENDIX OF CLAIMS

The claims on appeal are:

- 1        1. A method of accounting for services provided over a packet-based  
2 network, comprising:
  - 3              determining a type of service used over the network;
  - 4              monitoring usage of the service; and
  - 5              collecting accounting information based on the type of service and usage  
6 of the service, wherein collecting the accounting information includes compiling the  
7 accounting information into an accounting unit,  
8              wherein the accounting unit has a first entry to indicate a quality of service  
9 provided over the packet-based network, and a second entry to indicate mobility  
10 management.
- 1        2. The method of claim 1, wherein the determining, monitoring, and  
2 collecting are performed in a first entity, the method further comprising transmitting,  
3 from the first entity, the accounting unit to at least another entity.
- 1        3. The method of claim 2, further comprising assigning an identifier with the  
2 collected accounting information that is common between the first entity and the at least  
3 one other entity.
- 1        5. The method of claim 1, further comprising using an accounting unit  
2 having a common format for convenient exchange between entities.
- 1        6. The method of claim 1, further comprising using an accounting unit  
2 including a traffic matrix segment.

1           7.     The method of claim 1, wherein determining the type of service includes  
2 determining one of a plurality of service types, wherein collecting the accounting  
3 information comprises collecting an additional entry assigned a value to indicate a type of  
4 service.

1           8.     The method of claim 7, wherein determining one of the plurality of service  
2 types include determining one of real-time communications and at least another type of  
3 service.

1           16.    A method of accounting for services provided over a packet-based  
2 network, comprising:

3                 communicating a unit of accounting information carrying information  
4 regarding usage of the packet-based network by a terminal, the unit of accounting  
5 information having a predetermined format capable of being exchanged between a  
6 plurality of entities; and

7                 assigning values to entries in the unit of accounting information based on  
8 usage, the unit including a first entry indicating a quality of service provided over the  
9 packet-based network and a second entry containing a network access identifier of the  
10 terminal to uniquely identify the terminal.

1           17.    The method of claim 16, wherein assigning values to entries further  
2 includes assigning a value to an additional entry indicating a type of service.

1           18.    The method of claim 17, wherein assigning values to entries further  
2 includes assigning values to additional entries including entries indicating usage of a  
3 radio interface, indicating usage of a visited network, indicating usage of mobility  
4 management, and indicating an amount of data transferred.

1           19.    The method of claim 18, wherein assigning values to entries further  
2 includes assigning a value to an additional entry indicating erroneous termination of  
3 communications.

1           20.     The method of claim 19, wherein assigning values to entries further  
2 includes assigning a value to an additional entry indicating an amount of discarded data.

1           21.     A system capable of being coupled to a packet-based network,  
2 comprising:  
3                 a controller to collect usage information based on a service used by a node  
4 on the packet-based network; and  
5                 a storage device containing an accounting unit in which the usage  
6 information is collected, the accounting unit including a plurality of entries to identify  
7 usage elements from which accounting may be derived, the entries comprising a first  
8 entry to indicate a quality of service used by the node and a second entry to indicate  
9 usage of mobility management.

1           22.     The system of claim 21, wherein the entries of the accounting unit include  
2 an entry identifying a type of service used.

1           24.     The system of claim 21, wherein the entries of the accounting unit further  
2 comprise entries indicating elements used by a mobile node, including mobility  
3 management, usage of a radio interface, and usage of a visited network.

1           25.     The system of claim 21, wherein the accounting unit includes a traffic  
2 matrix segment.

1           26.     The system of claim 21, wherein the accounting unit is according to a  
2 predetermined format, the controller to further communicate the accounting unit to  
3 another entity.

1           27.     The system of claim 21, further comprising:  
2                 an accounting processor adapted to receive accounting units from at least  
3 one other entity.

1           28. The system of claim 27, wherein the accounting processor is adapted to  
2 generate billing to a subscriber based on one or more of the accounting units.

1           29. An article including one or more machine-readable storage media  
2 containing instructions for accounting for services used on a packet-based data network,  
3 the instructions when executed causing a system to:

4                 determine usage elements associated with each service, the usage elements  
5 including a service type, amount of data communicated, and mobility management; and  
6                 collect accounting units each including entries identifying the usage  
7 elements.

1           30. The article of claim 29, wherein the one or more storage media contain  
2 instructions that when executed cause the system to further communicate the accounting  
3 units to another entity.

1           31. A computer data signal embodied in a carrier wave comprising one or  
2 more code segments containing instructions for accounting for services used on a packet-  
3 based data network, the instructions when executed causing a system to:

4                 receive accounting units from at least another entity, each accounting unit  
5 containing a first entry identifying a quality of service, a second entry identifying a  
6 terminal the accounting unit is associated with, and a third entry indicating usage of  
7 mobility management;

8                 determine, from each accounting unit, usage of a service on the packet-  
9 based network; and

10                 charge at least a subscriber for the usage of the service.

1           32. A storage device for storing data for access by one or more software  
2 routines being executed on a system, comprising:

3                 a data structure stored in the storage device and including a plurality of  
4 entries, the entries including a first field indicating a quality of service provided over a

5 packet-based network, a second field indicating if the service is chargeable, and a third  
6 field including an identifier identifying a node using the service.

1           33. The storage device of claim 32, wherein the data structure further includes  
2 a field indicating if mobility management is provided for the node, a field indicating  
3 usage of a radio interface by the node, and a field indicating usage of a visited network by  
4 the node.

1           34. The method of claim 17, wherein assigning a value to the additional entry  
2 comprises assigning one of plural values corresponding to plural types of service.

1           35. The method of claim 34, wherein the plural types of service comprise real-  
2 time communications and at least another type of service.

1           36. The method of claim 16, wherein communicating the unit of accounting  
2 information comprises communicating a traffic matrix segment having a header and  
3 plural rows, each row containing accounting information associated with a session having  
4 a given time duration.

1           37. The method of claim 16, wherein assigning values to entries further  
2 includes assigning values to additional entries containing source and destination network  
3 addresses.

1           38. The method of claim 16, further comprising monitoring usage of services  
2 on the packet-based network with an accounting meter, wherein assigning values to the  
3 entries is performed by the accounting meter.

1           39. The article of claim 29, wherein the usage elements further comprise  
2 quality of service, usage of air interface, and a network access identifier.